

L3 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2006 ACS on STN

AN 2000:68192 CAPLUS

DN 132:93787

TI Dehydrofluorination process and **catalysts** for the preparation of 1,1,1,3-tetrafluoro-2-propenes from 1,1,1,3,3-pentafluoropropane

IN Elsheikh, Maher Yousef; Fellenger, Paul David

PA Elf Atochem North America, Inc., USA; Atofina Chemicals

SO Eur. Pat. Appl., 3 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 974571	A2	20000126	EP 1999-305781	19990721
	EP 974571	A3	20000412		
	EP 974571	B1	20030423		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 6124510	A	20000926	US 1998-119560	19980721
	JP 2000063300	A2	20000229	JP 1999-204714	19990719
	AT 238258	E	20030515	AT 1999-305781	19990721
	PT 974571	T	20030731	PT 1999-305781	19990721
	ES 2195520	T3	20031201	ES 1999-305781	19990721
PRAI	US 1998-119560	A	19980721		

AB Mixts. of cis- and trans-1,1,1,3-tetrafluoro-2-propene are prepared in high yield and selectivity by: (A) contacting 1,1,1,3,3-pentafluoropropane with an alkaline solution, preferably an aqueous or alc. solution of a base such as KOH, NaOH, Ca(OH)<sub>2</sub> or Mg(OH)<sub>2</sub>, or with a **chromium**-based **catalyst**, such as fluorided Cr<sub>2</sub>O<sub>3</sub> or fluorided Cr/Ni/AlF<sub>3</sub>; and (B) recovering the cis/trans-1,1,1,3-tetrafluoro-2-propene **isomer** mixture from the reaction mixture

L3 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2006 ACS on STN

AN 1994:298045 CAPLUS

DN 120:298045

TI Processes for producing 1,1,1,2,3-pentafluoropropene and producing 1,1,1,2,3-pentafluoropropane

IN Aoyama, Hirokazu; Seki, Eiji

PA Daikin Industries, Ltd., Japan

SO PCT Int. Appl., 35 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9325510	A1	19931223	WO 1993-JP661	19930519
	W: AU, BR, CA, JP, KR, RU, US				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	AU 9340888	A1	19940104	AU 1993-40888	19930519
	AU 664753	B2	19951130		
	EP 644173	A1	19950322	EP 1993-910362	19930519
	R: BE, DE, ES, FR, GB, IT, NL				
	EP 726243	A1	19960814	EP 1996-105492	19930519
	R: BE, DE, ES, FR, GB, IT, NL				
	BR 9306493	A	19980915	BR 1993-6493	19930519
	JP 3158440	B2	20010423	JP 1994-501327	19930519
	CA 2137279	C	20010821	CA 1993-2137279	19930519
	CN 1083040	A	19940302	CN 1993-106544	19930605
	US 5679875	A	19971021	US 1994-338528	19941130
PRAI	JP 1992-171949	A	19920605		
	JP 1992-179106	A	19920612		
	JP 1992-262865	A	19920904		
	JP 1992-262866	A	19920904		
	JP 1992-360966	A	19921229		
	EP 1993-910362	A3	19930519		

OS CASREACT 120:298045

AB This patent application describes a process for producing 1,1,1,2,3-pentafluoropropene in high yield from a readily available 1,1,1,2,3,3-hexafluoropropane industrially at low cost, which process comprises bringing the gaseous **hexafluoropropane** into contact with active carbon optionally containing a metallic salt to effect dehydrofluorination. Said application also describes a process for producing 1,1,1,2,3-pentafluoropropane with high conversion and high selectivity, which comprises reducing 1,1,1,2,3-pentafluoropropene with hydrogen in the presence of either a hydrogenation **catalyst** comprising palladium and one or more metals selected from among silver, copper, gold, tellurium, zinc, **chromium**, molybdenum and thallium, or a rhodium **catalyst**. 1,1,1,2,3,3-Hexafluoropropane (I) was passed through a reaction tube containing carbon at 450° to give 1,1,1,2,3-pentafluoropropene (E and Z isomers) (II) with 83.7% conversion of I and 96.9% selectivity for II. A mixture of II and hydrogen was introduced to a reaction tube filled with Cu-containing Pd **catalyst** on carbon (preparation given) at 80° to give 1,1,1,2,3-pentafluoropropane (III) with 99% conversion of II and 98% selectivity for III.

=&gt;

L4 ANSWER 7 OF 16 CAPLUS COPYRIGHT 2006 ACS on STN

AN 1995:630271 CAPLUS

DN 123:313381

TI Preparation of saturated gem-dichlorofluorocarbons by aluminum halide/halocarbon-catalyzed isomerization of dichlorofluorocarbons

IN Krespan, Carl G.; Petrov, Viacheslav A.; Smart, Bruce E.

PA du Pont de Nemours, E. I., and Co., USA

SO U.S., 5 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5416246	A	19950516	US 1994-323321	19941014
	WO 9611896	A1	19960425	WO 1995-US13458	19951010

W: JP

RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

PRAI US 1994-323321 A 19941014

OS CASREACT 123:313381; MARPAT 123:313381

AB A process is disclosed for producing a saturated gem-dichloro chlorofluorocarbon product of the formula  $C_nCl_aF_b$ , wherein n is 2 to 12, a is 2 to 4, and b is 4 to 24, and wherein  $a + b$  equals  $2n + 2$  when the chlorofluorocarbon is acyclic and equals  $2n$  when the chlorofluorocarbon is cyclic, from a starting material of the same formula which has a lesser thermodyn. stability than the saturated gem-dichloro chlorofluorocarbon product. The process involves **isomerizing** the starting material in the presence of (1) a **catalyst** of the formula  $AlZ_3$ , where Z is selected from F, Cl and/or Br (provided that  $AlZ_3$  cannot be entirely  $AlF_3$ ) and (2) an effective amount of promoter selected from the group consisting of hexafluoropropene, 2-chloropentafluoropropene, perfluorobutenes, perfluoropentenes, perfluorocyclobutene, 1-chlorocyclobutene, 1,2-dichlorocyclobutene, perfluorocyclopentene, 1-chlorocyclopentene, and 1,2-dichlorocyclopentene, and mixts. thereof, to accelerate production of the saturated gem-dichloro chlorofluorocarbon product. Also disclosed is a process for producing a halohydrocarbon of the formula  $C_nH_cCl_dF_b$  from a gem-dichloro product produced by said **isomerization** (where c is 1 to 4 and  $c + d = a$ ) which involves hydrodechlorinating the gem-dichloro product. Thus, e.g., **isomerization** of 1,2-dichlorohexafluoropropane over aluminum chlorofluoride in presence of hexafluoropropene afforded a quant. yield of 2,2-dichlorohexafluoropropane.

L4 ANSWER 8 OF 16 CAPLUS COPYRIGHT 2006 ACS on STN

AN 1993:538717 CAPLUS

DN 119:138717

TI Preparation of 2,2-dibromo- or dichloro-1,1,1,3,3,3-hexafluoropropane

IN Aoyama, Hiroichi; Seki, Eiji; Koyama, Satoru

PA Daikin Ind Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 05097723	A2	19930420	JP 1991-260347	19911008
PRAI	JP 1991-260347		19911008		

OS CASREACT 119:138717

AB The title compds., useful as intermediates for foaming agents, solvents, and refrigerants (no data), are prepared by isomerization of  $CF_2BrCFBrCF_3$  (I) or  $CF_2ClCFClCF_3$  in presence of  $AlCl_xF_yBr_z$  ( $0 \leq x, y, z < 3$ ;  $x + y + z = 3$ ) **catalysts**. I containing 10%  $CFBr_2CF_3$  was refluxed with  $AlCl_3$  for 5 h to give 98%  $CF_3CBr_2CF_3$ .

L4 ANSWER 5 OF 16 CAPLUS COPYRIGHT 2006 ACS on STN

AN 1998:210396 CAPLUS

DN 129:4422

TI Isomerization of halopolyfluoroalkanes by the action of aluminum chlorofluoride

AU Petrov, Viacheslav A.; Krespan, Carl G.; Smart, Bruce E.

CS Experimental Station, Cent. Res. and Dev., E. I. Du Pont de Nemours and Co., Wilmington, DE, 19880-0328, USA

SO Journal of Fluorine Chemistry (1998), 89(1), 125-130

CODEN: JFLCAR; ISSN: 0022-1139

PB Elsevier Science S.A.

DT Journal

LA English

OS CASREACT 129:4422

AB A combination of aluminum chlorofluoride (ACF)/fluoroolefin is an effective catalytic system for isomerization of vic-dichloroperfluoroalkanes into gem-isomers. For example, the isomerization of 1,2-dichloro-F-propane in the presence of catalytic amts. of ACF and hexafluoropropene proceeds at 130° giving 2,2-dichloro-F-propane in high yield. This catalytic system is also effective for converting cyclic 1,2-dichloro-F-cycloalkanes into 1,1-dichloro-F-cycloalkanes.

Dibromo-F-alkanes are more reactive and rearrange under the action of ACF alone at 25-100°. Primary moniodo- and monobromo-F-alkanes in the presence of ACF are converted into secondary isomers in moderate yields.

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 3 OF 16 CAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:685357 CAPLUS

DN 139:344687

TI Structural Insights into Aluminum Chlorofluoride (ACF)

AU Krahnl, Thoralf; Stoesser, Reinhard; Kemnitz, Erhard; Scholz, Gudrun;  
Feist, Michael; Silly, Gilles; Buzare, Jean-Yves

CS Institute of Chemistry, Humboldt University of Berlin, Berlin, Germany

SO Inorganic Chemistry (2003), 42(20), 6474-6483

CODEN: INOCAJ; ISSN: 0020-1669

PB American Chemical Society

DT Journal

LA English

AB The structure of the very strong solid Lewis acid aluminum chlorofluoride (ACF,  $\text{AlCl}_x\text{F}_3-x$ ,  $x = 0.05-0.3$ ) was studied by IR, ESR, Cl K XANES,  $^{19}\text{F}$  MAS NMR, and  $^{27}\text{Al}$  SATRAS NMR spectroscopic methods and compared with amorphous aluminum fluoride conventionally prepared by dehydration of  $\alpha\text{-AlF}_3 \cdot 3\text{H}_2\text{O}$ .  $\text{AlCl}_{0.13}\text{F}_{2.87}$  (designated as ACF-013) is the primary compound discussed. The thermal behavior of both compds. was investigated by DTA and XRD. In comparison to ACF, amorphous  $\text{AlF}_3$  prepared in a conventional way is not catalytically active for the **isomerization** reaction of 1,2-dibromohexafluoropropane, which requires a very strong Lewis acid. Both compds. are mainly built up of corner-sharing  $\text{AlF}_6$  octahedra forming a random network. The degree of disorder in ACF is higher than in amorphous  $\text{AlF}_3$ . Terminal fluorine atoms were detected in ACF by  $^{19}\text{F}$  NMR. The chlorine in ACF does not exist as a sep., crystalline  $\text{AlCl}_3$  phase. Addnl., chlorine-containing radicals, remaining from the synthesis, are trapped in cavities of ACF. These radicals are stable at room temperature but do not take part in the catalytic reaction.

RE.CNT 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2006 ACS on STN  
 AN 1985:522978 CAPLUS  
 DN 103:122978  
 TI 2,2-Dihalohexafluoropropanes  
 PA Daikin Kogyo Co., Ltd., Japan  
 SO Jpn. Kokai Tokkyo Koho, 3 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	JP 60078925	A2	19850504	JP 1983-187564	19831006
	JP 63002538	B4	19880119		
PRAI	JP 1983-187564		19831006		
AB	Title compds. F3CCX2CF3 (I; X = Cl, Br), useful as stable solvents (no data), were prepared by contacting F3CCFXCF2X (II) with fluorinted Al2O3 at high temperature. Thus, II (X = Cl) and N were passed at 400° through a reactor packed with fluorinated Al2O3 to give 55% I.				

(FILE 'HOME' ENTERED AT 12:09:36 ON 14 MAY 2006)

FILE 'CAPLUS, CAOLD' ENTERED AT 12:10:24 ON 14 MAY 2006

L1	95 S ?FLUOROPROPANE (P) ISOMER?
L2	18 S L1 AND CATALYST
L3	2 S L2 AND CHROMIUM
L4	16 S L2 NOT L3

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-097723

(43)Date of publication of application : 20.04.1993

(51)Int.Cl.

C07C 19/08  
B01J 27/125  
C07C 17/00  
// C07B 61/00

(21)Application number : 03-260347

(71)Applicant : DAIKIN IND LTD

(22)Date of filing : 08.10.1991

(72)Inventor : AOYAMA HIROICHI  
SEKI EIJI  
KOYAMA SATORU

### (54) PRODUCTION OF 2,2-DIBROMO OR DICHLORO-1,1,1,3,3,3-HEXAFLUOROPROPANE

(57)Abstract:

PURPOSE: To obtain the subject compound on an industrial scale in high yield at a low cost by isomerizing 1,2-dibromo or dichloro-1,1,2,3,3,3-hexafluoropropane in the presence of a specific catalyst.

CONSTITUTION: The objective 2,2-dibromo or dichloro-1,1,1,3,3,3- hexafluoropropane is produced by isomerizing 1,2-dibromo or dichloro-1,1,2,3,3,3-hexafluoropropane in the presence of a catalyst composed of a compound of formula ((x), (y) and (z) are numbers satisfying the formulas  $0 \leq x < 3$ ,  $0 \leq y < 3$ ,  $0 \leq z < 3$  and  $(x+y+z)=3$ ) at 20-60°C under a pressure from atmospheric pressure to 5kg/cm<sup>2</sup>G. The catalyst can be produced by treating anhydrous aluminum chloride or anhydrous aluminum bromide with trichlorofluoromethane, dichlorofluoromethane, 1,1-dibromo-1,2,2,2-tetrafluoroethane, etc.

$AlCl_xF_yBr_z$

### LEGAL STATUS

[Date of request for examination]



[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the process of 2 which is a compound useful as intermediate products, such as a foaming agent, a solvent, and a refrigerant, 2-dibromo, or dichloro-hexafluoropropane.

[0002]

[Description of the Prior Art] Fluoroalkane, CFC12cc12F [ for example, ], CF2C1cc12F, That CF2BrCHC1F, CF2BrCFC1Br, and CF2ClCHFI are given to the molecule transition reaction made into a catalyst, and deal in aluminum halide For example, HADORIKKI (M. Hudlicky), chemistry OBU organic Florin contribution UNZU (Chemistry of Organic Fluorine Compounds), It is known by the 2nd edition (John Wiley & Sons (John Wiley & Sons), and [501-2] (1976)).

[0003] Moreover, it is 1 and 2-dibromo, using aluminum halide as a catalyst. - 1 from 1, 1, 2, and 2-tetrafluoro ethane, 1-dibromo - The method of manufacturing 1, 2, 2, and 2-tetrafluoro ethane is also learned (JP,2-61926,A).

[0004]

[Problem(s) to be Solved by the Invention] However, 1, 2-dihalo - Isomerizing 1, 1, 2, 3, 3, and 3-hexafluoropropane to corresponding 2 and 2-dihalo hexafluoropropane is not reported until now. Moreover, this invention persons are 1 and 2-dihalo about anhydrous salt-ized aluminum. - Even if it makes 1, 1, 2, 3, 3, and 3-hexafluoropropane contact and carries out heating reflux, it is 1 and 2-dihalo. - It is checking that isomerization of 1, 1, 2, 3, 3, and 3-hexafluoropropane does not advance at all, or requires very long reaction time, and a reaction cannot complete it easily.

[0005] This invention is 1 and 2-dihalo. - It is going to offer the approach of isomerizing 1, 1, 2, 3, 3, and 3-hexafluoropropane to corresponding 2 and 2-dihalo hexafluoropropane.

[0006]

[Means for Solving the Problem] As a result of inquiring wholeheartedly, anhydrous salt-ized aluminum or the anhydrous aluminium bromide that artificers should solve the above-mentioned technical problem Trichlorofluoromethane, Fluoro carbon 21, 1, and 1-dibromo - [ whether the formula obtained by processing using 1, 2, 2, and 2-tetrafluoro ethane etc. is used as a catalyst, and ] 1 and 2-dibromo or dichloro which it is going to isomerize - They are 1 of 0.1 equivalence, and 1-dibromo at least to aluminum halide in the medium which consists of 1, 1, 2, 3, 3, and 3-hexafluoropropane. - 1, 2, 2, and 2-tetrafluoro ethane, If the compound shown by the above-mentioned formula (I) which trichlorofluoromethane, fluoro carbon 21, etc. are made to act and is obtained is used as a catalyst 1 and 2-dibromo or dichloro - 1, 1, 2, 3, 3, and 3-hexafluoropropane By short reaction time, under the conditions which can be reproduced, perfect control of a reaction process could be isomerized as it is \*\*\*\*, and it found out that 2 and 2-dibromo or dichloro-hexafluoropropane could moreover be manufactured by high yield low cost on a scale of industry, and this invention was completed.

[0007] namely, summary of this invention  $AlCl_xF_yBr_z$  (I) [-- the inside of a formula, x, and y and z --  $0 \leq x < 3$ ,  $0 \leq y < 3$ , and  $0 \leq z < 3$  and  $x+y+z=3$ .] Under existence of the

catalyst which comes out and consists of the compound shown, they are 1 and 2-dibromo or chloro. - 2 and 2-dibromo or dichloro which consists of isomerizing 1, 1, 2, 3, 3, and 3-hexafluoropropane - It consists in the process of 1, 1, 1, 3, 3, and 3-hexafluoropropane.

[0008] In preparing the compound shown in this invention by the formula (I) preferably used as an isomerization catalyst out of the system of reaction To commercial anhydrous salt-ized aluminum or the commercial anhydrous aluminium bromide, hydrogen fluoride, Fluoric acid and carbon number 4 less or equal preferably A with a carbon number of two or less fluoro hydrocarbon, a chloro fluoro hydrocarbon or a BUROMO fluoro hydrocarbon (for example, trifluoromethane --) Tetrafluoro ethane, chlorodifluoromethane, fluoro carbon 21, A trifluoro dichloroethane, trifluorochloromethane, a dichlorodifluoromethane, Trichlorofluoromethane, difluoro tetrachloroethane, trifluoro trichloroethane, 1, and 1-dibromo tetrafluoro ethane etc. can be made to be able to act, and it can manufacture. These compounds may be made to act independently, respectively, it may mix and they may be made to act, and it may mix with chlorohydrocarbon and they may be made to act depending on the case in that case.

[0009] 0 degree C - 120 degrees C, it is a 0 degree C - 100 degrees C temperature requirement preferably, and contact to anhydrous salt-ized aluminum or the anhydrous aluminium bromide carries out the temperature conditions at the time of preparation of the above-mentioned catalyst, the compound made to act may be contacted in the state of a liquid, and it may contact [ a way may be circulated as a gas and ] them.

[0010] 1 and 2-dibromo or dichloro which prepares the above-mentioned compound (I) within the system of reaction and which it is going to case [ dichloro ] namely, isomerize - in preparing in 1, 1, 2, 3, 3, and 3-hexafluoropropane medium As opposed to anhydrous salt-ized aluminum or the anhydrous aluminium bromide The four or less above-mentioned carbon number of 0.1 - 10 equivalence, By adding a with a carbon number of two or less fluoro hydrocarbon, a chloro fluoro hydrocarbon, or a BUROMO fluoro hydrocarbon in the system of reaction preferably, the compound shown by the formula (I) is prepared first, and isomerization advances. The temperature conditions in this case are usually 20 degrees C - 60 degrees C.

[0011] Especially the amount of the catalyst used for isomerization is 1 and 2-dibromo or dichloro which it is usually going to isomerize although not limited. - It is 0.1 - 10 % of the weight preferably 0.05 to 30% of the weight to 1, 1, 2, 3, 3, and 3-hexafluoropropane.

[0012] The reaction temperature of isomerization is a 20-60-degree C temperature requirement preferably, and although especially reaction pressure is not limited, it is usually the range of 5kg/cm2G from atmospheric pressure.

[0013]

[Effect of the Invention] According to this invention, they are 1 and 2-dibromo or dichloro. - by only contacting 1, 1, 2, 3, 3, and 3-hexafluoropropane for a catalyst with the reaction temperature of 20 degrees C - 60 degrees C 1 and 2-dibromo or dichloro - 2 and 2-dibromo or dichloro which perfect isomerization of 1, 1, 2, 3, 3, and 3-hexafluoropropane is attained, consequently is an isomer - 1, 1, 1, 3, 3, and 3-hexafluoropropane is obtained with 90% or more of yield.

[0014]

[Example] Hereafter, an example explains this invention in more detail.

An example 11, 1-dibromo - 1, 2-dibromo containing 1, 2, 2, and 2-tetrafluoro ethane (10g) - The aluminum chloride (5g) was added in 1, 1, 2, 3, 3, and 3-hexafluoropropane (100g), and heating churning was carried out in reflux temperature for 5 hours. After reaction termination, when NMR analyzed the reaction mixture, the invert ratio of 1 and 2-dibromo hexafluoropropane is 100%, and 2 and 2-dibromo hexafluoropropane was generating it at 98% of yield.

[0015] The aluminum chloride (3g) was added to 1 and 2-dibromo hexafluoropropane (100g) containing example 2 trichlorofluoromethane (4.6g), and it agitated at 20 degrees C for 3 hours. Then, it agitated in reflux temperature for 5 hours, and when it was made to react and NMR analyzed the reaction mixture, the invert ratio of 1 and 2-dibromo hexafluoropropane is 100%, and 2 and 2-dibromo hexafluoropropane was generating it at 96% of yield.

[0016] Anhydrous salt-ized aluminum (3g) and trichlorofluoromethane (9.3g) were taught to 50ml glass

flask equipped with the capacitor (cooling temperature of 5 degrees C) furnished with calcium chloride tubing for example 3 moisture traps. It was made reduced pressure after 3-hour churning at the room temperature, and the carbon tetrachloride generated unreacted trichlorofluoromethane and from now on, a dichlorodifluoromethane, and trifluorochloromethane were removed, and the catalyst was acquired.

[0017] The obtained catalyst whole quantity and 1 and 2-dibromo hexafluoropropane (100g) were mixed, and heating churning was carried out at reflux temperature for 5 hours. When NMR analyzed the reaction mixture, the invert ratio of 1 and 2-dibromo hexafluoropropane is 100%, and 2 and 2-dibromo hexafluoropropane was generating it at 97% of yield.

[0018] When the catalyst was prepared in the same procedure as an example 3 except replacing with example 4 trichlorofluoromethane and using fluoro carbon 21 (9g), isomerization was performed and the reaction mixture was analyzed, the invert ratio of 1 and 2-dibromo hexafluoropropane is 100%, and 2 and 2-dibromo hexafluoropropane was generating it at 96% of yield.

[0019] When it reacted in the same procedure as an example 1 except replacing with an example 51 and 2-dibromo hexafluoropropane, and using 1 and 2-dichloro hexafluoropropane and the reaction mixture was analyzed, an invert ratio is 100% and 2 and 2-dichloro hexafluoropropane was generating it at 96% of yield.

[0020] After teaching anhydrous salt-sized aluminum 3g to the autoclave made from 6100ml stainless steel of examples and making the inside of a system reduced pressure, fluoro carbon 21 (9g) was taught at 5 degrees C. It was made to react at 20 degrees C for 2 hours, extracting the trifluoromethane and chlorodifluoromethane to generate out of a system. Unreacted fluoro carbon 21 and the generated chloroform were removed under reduced pressure, and the catalyst was acquired. 1 and 2-dichloro hexafluoropropane (100g) was taught here, and it heated at 50 degrees C for 4 hours. After cooling, when the contents of an autoclave were analyzed, the invert ratio was 100% and the selectivity of 2 and 2-dichloro HEKISAFURU fluoro propane was 95%.

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[Translation done.]

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 60-078925

(43)Date of publication of application : 04.05.1985

(51)Int.Cl.

C07C 19/08  
C07C 17/24

(21)Application number : 58-187564

(71)Applicant : DAIKIN IND LTD

(22)Date of filing : 06.10.1983

(72)Inventor : AISAKA YONOSUKE  
TOUTSUKA TAKASHI

## (54) PRODUCTION OF 2,2-DIHALOGENOHEXAFLUOROPROPANE

### (57)Abstract:

PURPOSE: To produce the titled compound useful as an extremely stable solvent, in high yield, by contacting fluorinated alumina at a high temperature with a compound obtained by the addition of chlorine or bromine to hexafluoropropylene under the radiation of light.

CONSTITUTION: The compound of formula I (X is Cl or Br) is made to contact with a readily available fluorinated alumina at a high temperature, preferably at 300W500°C to obtain 2,2-dihalogenoheptafluoropropane of formula II.

The starting compound of formula I may be used by diluting with an inert gas such as nitrogen. 2,2-

Dichlorohexafluoropropane can be produced in a yield of  $\geq 50\%$  by this process, and 2,2-

dibromohexafluoropropane can be obtained in a short time in a yield of  $\geq 60\%$ . The process is especially suitable when X is Cl.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than  
the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

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